

PATENT

Attorney Docket No.: WEAT/0487

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Claims:

1. An expander tool for use in a wellbore, the expander tool comprising:
 - a body having at least one recess formed therein; and
 - an expansion assembly disposable in the at least one recess, the expansion assembly comprising:
 - a piston that is outwardly extendable from the body in response to the radially outward force; and
 - a roller rotationally disposed on a shaft, wherein the roller and the shaft are constructed and arranged on the piston at an angle relative to a longitudinal axis of the expander tool.
2. The expander tool of claim 1, wherein the angle is outward from a center line of the expander tool.
3. The expander tool of claim 1, further including a bearing body disposed adjacent the roller.
4. The expander tool of claim 3, wherein the bearing body includes a front bearing body operatively attached to the roller, thereby rotating with the roller.
5. The expander tool of claim 4, wherein the bearing body further includes a back bearing body operatively attached to the piston, thereby remaining rotationally stationary.
6. The expander tool of claim 5, further including a cooling channel disposed between the front bearing body and the back bearing body.
7. The expander tool of claim 6, wherein the cooling channel is a helical groove formed in the front bearing body.
8. The expander tool of claim 7, wherein the cooling channel is a fluid path constructed and arranged to promote the ingress of a fluid therein.

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9. The expander tool of claim 8, wherein the fluid creates a fluid cushion between the front bearing body and the back bearing body, thereby reducing the friction therebetween.
10. The expander tool of claim 2, wherein the shaft is angled at 10.0 degrees relative to the longitudinal axis of the expander tool.
11. The expander tool of claim 10, wherein the roller is tapered to provide an outer surface thereof at 20.0 degrees from the longitudinal axis of the expander tool.
12. The expander tool of claim 1, further including a second roller disposed adjacent the roller, the second roller having a smaller outer diameter than the roller.
13. The expander tool of claim 12, wherein the second roller rotates at a different rate than the roller.
14. The expander tool of claim 1, wherein an outer diameter portion of the piston includes at least a portion disposed at either end thereof having an outer surface for substantially contacting an inner surface of the recess, the portions having substantial width to prevent tipping of the piston in the recess.
15. An expander tool for use in a wellbore, the expander tool comprising:
 - a body having at least one recess formed therein; and
 - an expansion assembly disposable in the at least one recess, the expansion assembly comprising:
 - a piston which is outwardly extendable from the body in response to the radially outward force;
 - a roller rotationally disposed on a shaft;
 - an upper bearing body disposed adjacent an upper end of the roller, wherein the upper bearing body includes a front bearing body and a rear bearing body; and

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a lower bearing body disposed adjacent a lower end of the roller.

16. The expander tool of claim 15, wherein the front bearing body is operatively attached to the roller, thereby rotating with the roller.
17. The expander tool of claim 15, wherein the back bearing body is operatively attached to the piston, thereby remaining rotationally stationary.
18. The expander tool of claim 15, further including a cooling channel disposed between the front bearing body and the back bearing body.
19. The expander tool of claim 15, wherein an outer diameter portion of the piston includes at least a portion disposed at either end thereof having an outer surface for substantially contacting an inner surface of the recess, the portions having substantial width to prevent tipping of the piston in the recess.
20. An expander tool for use in a wellbore, the expander tool comprising:
 - a body having at least one recess formed therein; and
 - an expansion assembly disposable in the at least one recess, the expansion assembly comprising:
 - a piston disposable within a recess of the expander tool, the piston being outwardly extendable from a body of the expander tool in response to a radially outward force;
 - a first roller rotationally disposed on a shaft; and
 - a second roller rotationally disposed on the shaft adjacent the first roller, whereby the second roller rotates at a different rate than the first roller.
21. The expander tool of claim 20, wherein the expansion assembly comprises at least one additional roller.

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22. The expander tool of claim 20, wherein the first and second rollers and the shaft are constructed and arranged on the piston at an outward angle relative to a longitudinal axis of the expander tool.
23. The expander tool of claim 20, wherein the first and second rollers are angled at 10.0 degrees relative to the longitudinal axis of the expander tool.
24. The expander tool of claim 20, further including a bearing body disposed adjacent the first roller, the bearing body having a front bearing body and a back bearing body.
25. The expander tool of claim 24, further including a cooling channel disposed between the front bearing body and the back bearing body.
26. The expander tool of claim 25, wherein the cooling channel is a helical groove formed in the front bearing body.
27. The expander tool of claim 25, wherein the cooling channel is a fluid path constructed and arranged to promote the ingress of a fluid therein.
28. The expander tool of claim 27, wherein the fluid creates a fluid cushion between the front bearing body and the back bearing body, thereby reducing the friction therebetween.
29. A method for expanding a tubular body within a wellbore, comprising:
disposing an expander tool at a lower end of a working string, the expander tool having a body and a plurality of recesses formed therein for receiving an expansion assembly, each expansion assembly comprising:
a piston which is outwardly extendable from the body in response to a radially outward force;
a roller rotationally disposed on a shaft;

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an upper bearing body disposed adjacent an upper end of the roller, wherein the upper bearing body includes a front bearing body and a rear bearing body; and

 a lower bearing body disposed adjacent a lower end of the roller;
 placing the expander tool into the wellbore proximate the tubular body;
 activating the expander tool, wherein the expansion assembly extends radially outward; and
 expanding the tubular body within the wellbore.

30. The method of claim 29, wherein the front bearing body is operatively attached to the roller, thereby rotating with the roller and the back bearing body is operatively attached to the piston, thereby remaining rotationally stationary.

31. The method of claim 30, wherein a cooling channel is disposed between the front bearing body and the back bearing body.

32. The method of claim 31, further including providing a fluid into the cooling channel to cool the bearing body and reduce the friction between the front bearing body and the back bearing body.

33. An expansion assembly for use with an expander tool, the expansion assembly comprising:

 a piston disposable within a recess of the expander tool, the piston being outwardly extendable from a body of the expander tool in response to a radially outward force;

 a roller rotationally disposed on a shaft, wherein the roller and the shaft are constructed and arranged on the piston at an angle relative to a longitudinal axis of the expander tool; and

 a bearing body disposed adjacent the roller.

34. The expansion assembly of claim 33, wherein the bearing body includes a front bearing body operatively attached to the roller, thereby rotating with the roller.

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35. The expansion assembly of claim 34, wherein the bearing body further includes a back bearing body operatively attached to the piston, thereby remaining rotationally stationary.

36. The expansion assembly of claim 35, further including a cooling channel disposed between the front bearing body and the back bearing body.

37. An expander tool for use in a wellbore, the expander tool comprising:
an annular body having at least one recess formed in an outer surface thereof, wherein the recess is skewed relative to a longitudinal axis of the expander tool; and
one or more expander assemblies, each comprising an expander mounted on a slidable piston, wherein each expander assembly is disposed within one of the at least one recesses.

38. The expander tool of claim 37, wherein the expander is a roller having an axis skewed relative to a longitudinal axis of the expander tool to provide a tractoring effect when in contact with an inside surface of a surrounding tubular.